Tumour cells create ribosome reservoirs that allow them to survive under adverse conditions

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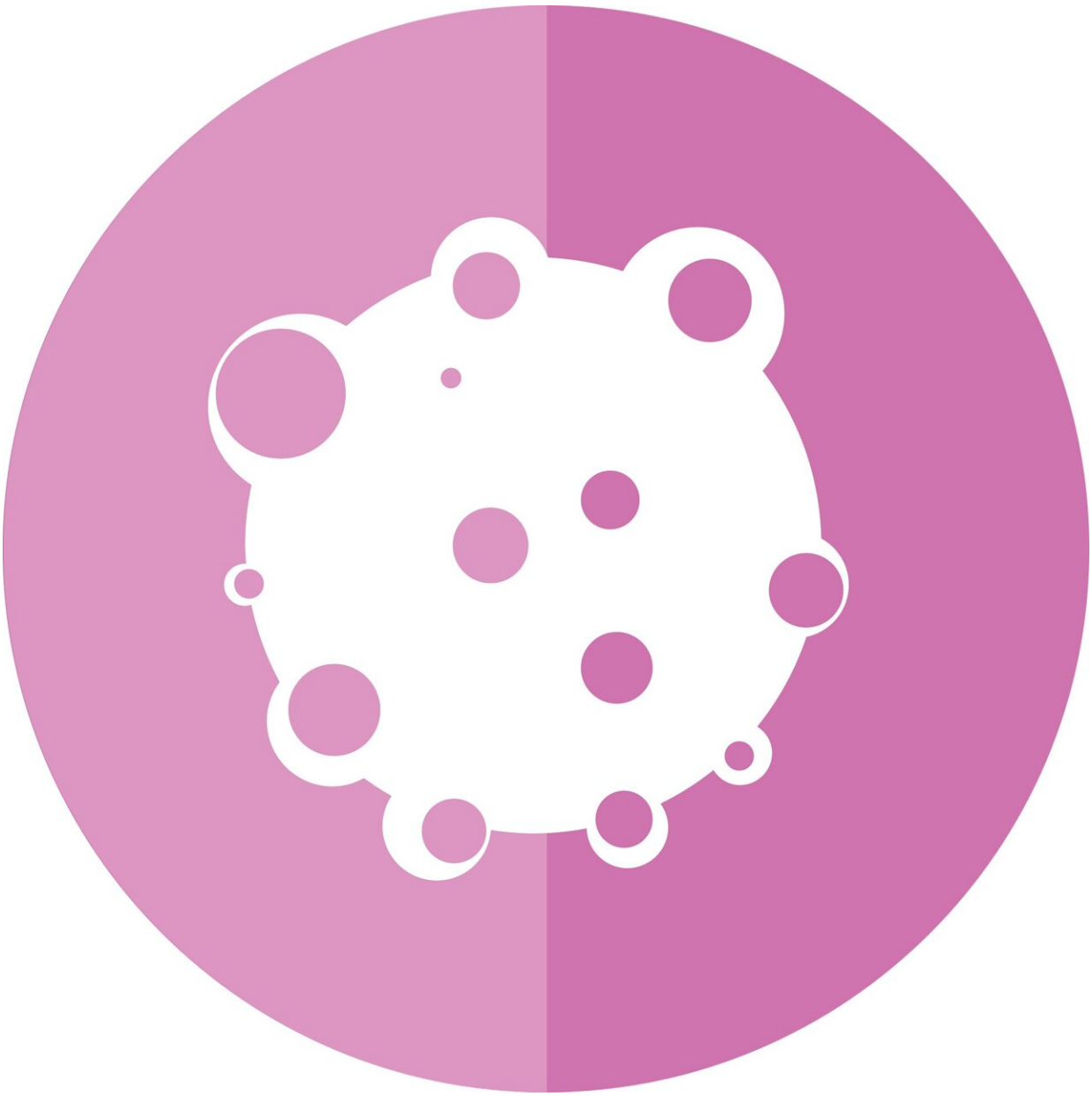

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Researchers of the University of Barcelona and IDIBELL have found a mechanism that could explain the reappearance of tumors after clinical treatment. According to their research study, tumor cells are able to detect when levels of nutrients and energy decrease, and they enter a low-energy-consumption mode and store all the necessary material to reactivate their growth afterwards.

This ability allows tumor cells to "wake up" quickly once favorable conditions are re-established and they can resume cell division. The researchers are now studying how to inhibit the formation of these reservoirs and therefore prevent relapses.

Cancer occurs due to the uncontrolled proliferation of cells, which end up invading and destroying tissues and organs. For a tumor to increase its size, it needs cancer cells to produce all the necessary proteins to create the required biomass to grow and divide. The factories produced by proteins are the ribosomes; therefore, the ability to generate new ribosomes is critical for the most aggressive tumors.

The study, led by Antonio Gentilella, tenure-track 1 lecturer at the Department of Biochemistry and Physiology and principal researcher of the Group on Metabolism and Cancer at IDIBELL, describes the strategy of tumors to continue creating ribosomes under adverse conditions: When cancer cells detect that they are in a low-nutrient environment, they can send an internal signal so that the LARP1 protein and the 40S ribosomal unit sequester all the mRNAs they need to create ribosomes.

The tumor growth environment, and chemotherapy as well, create unfavorable conditions of lack of nutrients and oxygen that could promote the creation of ribosome reservoirs that survive these conditions. Therefore, it is easy to think that it could be an important mechanism for the reappearance of tumors after therapy.

The research was published in *Science Advances*.

More information: Pedro Fuentes et al, The 40 S -LARP1 complex reprograms the cellular translatome upon mTOR inhibition to preserve the protein synthetic capacity, *Science Advances* (2021). DOI: 10.1126/sciadv.abg9275

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